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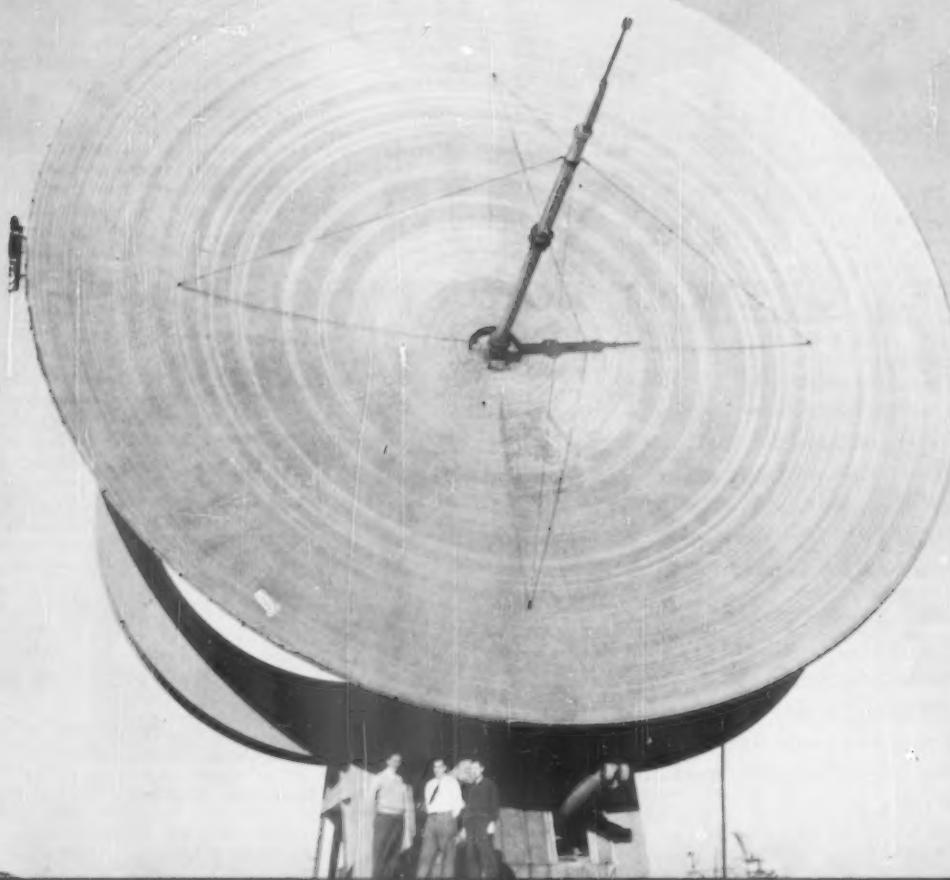
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SCIENCE NEWS LETTER

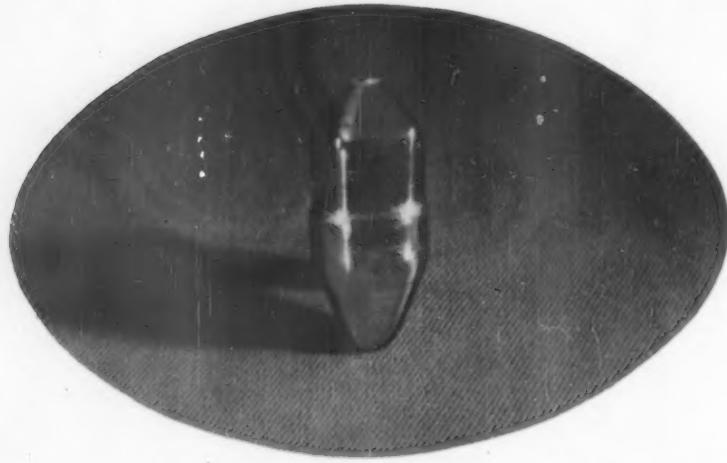
THE WEEKLY SUMMARY OF CURRENT SCIENCE



600-Inch "Saucer"

See Page 23

A SCIENCE SERVICE PUBLICATION



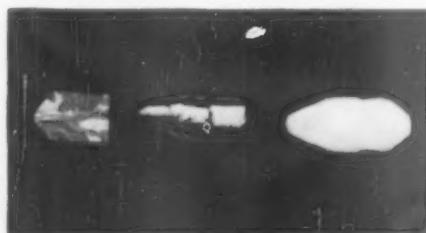
Germanium crystal grown at Bell Telephone Laboratories (half size). It is sliced into hundreds of minute pieces to make Transistors. Transistor action depends on the flow of positive current-carriers as well as electrons, which are negative. Arsenic—a few parts per 100,000,000—added to germanium produces prescribed excess of electrons. With gallium added, positive carriers predominate. Latest junction type Transistor uses both kinds of germanium in the form of a sandwich.

THEY GREW IT FOR TRANSISTORS

Heart of a **Transistor**—Bell Telephone Laboratories' new pea-size amplifier—is a tiny piece of germanium. If **Transistors** are to do their many jobs well, this germanium must be of virtually perfect crystalline structure and uniform chemical composition. But it doesn't come that way in nature.

So—Bell scientists devised a new way to grow the kind of crystals they need, from a melt made of the natural product. By adding tiny amounts of special alloying substances to the melt, they produce germanium that is precisely tailored for specific uses in the telephone system.

This original technique is another example of the way Bell Laboratories makes basic discoveries—in this case the **Transistor** itself—and then follows up with practical ways to make them work for better telephone service.



Section of natural germanium, left, shows varying crystal structure. At right is sectioned single crystal grown at Bell Laboratories.

BELL TELEPHONE LABORATORIES



IMPROVING TELEPHONE SERVICE FOR AMERICA PROVIDES CAREERS FOR CREATIVE MEN IN SCIENTIFIC AND TECHNICAL FIELDS

GENERAL SCIENCE

AAAS Meeting Highlights

Scientists attending the 120th meeting of the American Association for the Advancement of Science met in nearly 300 sessions at which close to 2,000 papers were presented.

► HIGHLIGHTS AMONG the reports to the American Association for the Advancement of Science meeting in Boston included:

Children spend more than 20 hours a week looking at TV in big cities like Chicago, and teachers and parents should work together to make the most of it.—Dr. Paul Witty, Northwestern University.

Educators used to live longer than the general run of the population, but now this extra longevity seems to be disappearing.—Dr. Henry F. Dickenson, Lincoln Memorial University, Harrogate, Tenn.

Fruit flies that crowd into the center of the food in their glass bottle worlds are less resistant to DDT than those that pupate along the edges.—Dr. Robert R. Sokal and Preston E. Hunter of University of Kansas.

Red fluorescent light of high intensity, supplemented with blue, makes tomato plants under artificial illumination produce more, on a dry weight basis.—Dr. Stuart Dunn, University of New Hampshire.

More stomach cancer is found among relatives of persons with stomach cancer than among relatives of those who do not have this disease.—Dr. George W. Hagy, Southwestern Medical School of University of Texas, Dallas.

Scientists are trying to breed rats having hereditary high blood pressure and diabetes similar to the human ailments to aid them in their search for new combatant chemicals and drugs.—F. M. Sturtevant of G. D. Searle and Co.

Creams, including the silicone ones, supposed to protect workers from skin eruptions due to oil used in cutting steel at high speeds, fail to keep these oils from the skin in 20 out of 24 cases.—Dr. George E. Morris, Boston dermatologist.

Tooth Decay by Diet

Tooth decay, everybody's disease that costs one billion dollars annually in U.S. teeth care, can now be produced experimentally by special diets in rats, hamsters and monkeys.—Dr. Reidar F. Sognnaes, Harvard School of Dental Medicine, Boston.

A living tooth cannot decay in the complete absence of bacteria or in the complete absence of food, germ-free tests at the University of Notre Dame demonstrate.—Dr. Frank J. Orland, Zoller Dental Clinic, University of Chicago.

Experiments on 17 generations of rats show that a factor in dental decay is inheritance of a chemical peculiarity of the mouth, persistent presence of *Lactobacillus acidophilus*.—Drs. H. R. Hunt, C. A. Hoppert and Samuel Rosen of Michigan State College.

House mice in crowded pens, as density of their population increases, fight each other, tear up nests and become cannibals, thus limiting population to resources.—Dr. Charles H. Southwick, Hamilton College, Clinton, N. Y.

Man's mental life can be thought of as the manifestation of an organized, self-regulating biological system raised to its highest level.—Prof. Edmund W. Sinnott, Yale University.

To our consternation we are discovering that water, air and light are not alike in abundance. In many places water must undergo expensive handling and treatment before use. For the individual, it is far from free.—Carl G. Paulsen, chief hydraulic engineer, U. S. Geological Survey.

Elliptical Meteor Orbit

All the fireball meteors that occasionally flash in the sky come from our own solar system and have elliptical orbits like asteroids, rather than hyperbolic like some comets.—Dr. C. C. Wylie of State University of Iowa.

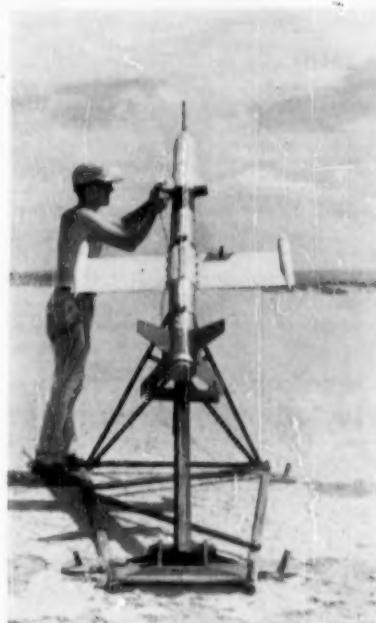
Less than a third of engineering graduates remain in engineering throughout their careers, and those that go into management make the change between the ages of 28 and 32.—Prof. J. Myron Johnson, Stevens Institute of Technology, Hoboken, N. J.

The interaction of so-called natural forces need not predestine tomorrow's cities to unplanned development, but wise and informed planning can rescue communities from the consequences of bad location and spacing of new communities.—Prof. John T. Howard, Massachusetts Institute of Technology.

What is dangerous in levels of atomic radiation for communities must be kept flexible and not written into law, so that such levels can be modified with advancing knowledge.—Dr. Shields Warren, Boston pathologist and AEC consultant.

The single original cell from which all living organisms have arisen could have evolved in a shorter time than previously imagined, since yeast cell experiments show that microscopic cells that have undergone little change in a billion years can be modified and hand on to the next generation an ability to use a food.—Dr. Carl C. Lindgren and David D. Pittman, Southern Illinois University.

Human beings need to be studied as intensively as the new machines with which they perform complex controls in order to create automatic factories and other devices.—Dr. Gilbert K. Krueke, Tufts College, Medford, Mass.



DESIGN TESTS—This rocket-driven device provides supersonic testing of scale models of wing designs for future aircraft. The model wing is mounted on a five-inch high-velocity combat rocket, and electronic instruments packed in the 74-inch rocket laboratory radio back to the ground reports on the wing's characteristics at speeds about twice supersonic.

New welding techniques, which generate from 15 to 30 times more dangerous ultraviolet and infrared rays, may possibly bring on skin cancer if ordinary protective clothing for welders is faulty.—Dr. Robert C. Thompson, General Electric Company.

Although America has poured over 2.5 trillion dollars into highways and vehicles, little has been spent to determine why man reacts as he does as a driver; to cut highway fatalities, science should re-evaluate the highway program in terms of human capacity, spur new and better driver education in schools, and rewrite laws to fit human capacities.—Paul H. Blaisdell of the Association of Casualty and Surety Companies.

That color plays a role in the society of ducks was shown when ducklings caged with a red decoy and ducklings caged with a blue decoy later showed tolerance to live birds of the same respective colors; there was fighting and avoidance when ducks of "unfamiliar" colors were placed in the cages.—John V. Quaranta of Marymount College, N. Y.

Although significant genetic differences were found in past studies of blood groups, scientists were unable to differentiate between such groups as Finns and Arabs, or

Russians and Negroes; current studies of Europeans, Africans, Asiatics, Australian aborigines and Pacific Island inhabitants, however, are revealing striking racial differences in the gene frequencies of almost all blood group systems.—Philip Levine of Ortho Research Foundation.

"Social physics," which can serve business executives, legislators, lawyers and public relations counselors, needs to be explored more thoroughly to help the "human engineer" solve some of the industrial problems that arise from day to day.—G. Edward Pendray of Pendray and Co.

Science News Letter, January 9, 1954

CYTOTOLOGY

Developing Brain Cell Nucleus Not Determined

► THE NUCLEUS of a cell that is developing into brain or bone in a frog embryo is capable of participating in the formation of all other body tissues, Drs. Thomas J. King and Robert Briggs, Institute for Cancer Research and Lankenau Hospital Research Institute, Philadelphia, reported at the American Association for the Advancement of Science meeting in Boston.

Drs. King and Briggs took the nucleus from cells that had partially differentiated and planted them in an undifferentiated egg cell without a nucleus. The experiment showed that the nucleus from the older cell can join with the egg to form a complete embryo.

The cell nucleus through the gastrula stage of embryological development is still unlimited in its potentialities. This shows that the basic changes in the cells as differentiation progresses do not involve the nucleus, the scientists pointed out.

Science News Letter, January 9, 1954

ICHTHYOLOGY

Fish School "Swims" in Rock 350,000,000 Years

► A SCHOOL of 350,000,000-year-old fish, of previously unknown type, has recently been discovered in a rock formation near Oslo, Norway.

Completely intact, with heads, eyes, tails and fins clearly outlined in the rock, the 40 fossilized specimens were identified as belonging to a group known as cephalaspids, one of the earliest vertebrate types.

The discovery was made in the district of Ringerike, about 30 miles north of Oslo, by Dr. Robert Denisen of the Chicago Museum of Natural History, and Profs. Leif Stormer and Anatol Heintz of the Paleontological Museum in Oslo.

Other rare specimens of primitive fishes, sea scorpions and crustaceans, discovered in the same district in 1911, have been collected in the Oslo Paleontological Museum. One of the sea scorpions is over 31 inches long.

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GENERAL SCIENCE

Research Business Costly

► IT COSTS American industry about \$2,500,000,000 a year to give you more deadly insect killers, more efficient cars, more rugged electric mixers and more sensitive fever thermometers.

Add to this amount another \$1,250,000,000. This is the bill covering the development of better airplanes for your son in the Air Force, or a bullet-proof vest for your boy in the Army, or better lifeboats for your sailor son and his buddies, or a safer landing craft for your teen-aged Leatherneck.

In short, research in this country is big business. It cost \$3,750,000,000 just to keep America clicking in 1952. During that year, about 96,000 research engineers and scientists labored over test tubes, slide rules, blueprints and calculations to produce the gizmos, machines and instruments that help make this country what it is.

These figures and findings, the latest available, have been compiled by the U.S. Department of Labor in a 106-page report, "Scientific Research and Development in American Industry." The figures come from questionnaires returned by 2,000 companies. They represent an estimated 85% of America's full research potential.

Turnover in the research ranks became a matter of "grave concern" as the Korean War created a different kind of military conflict: a need for young men in the armed services and, at the same time, a need for more researchers to carry out defense developments.

Yet in spite of the Korean War, the military services took only three men out of each 100 research workers employed, on the average. About 13 others per 100 researchers either quit, retired, were laid off, were fired or died.

However, at the beginning of 1952, the number of young men in industrial research who were subject to military duty jumped to an average of 25 out of each 100 researchers. About 19 of these men were members of the reserves or National Guard. The other six were classified 1A or 2A.

Industry has considered getting the utmost from its research workers by supplying them with a staff of technicians to twirl knobs, take hourly readings and run series of long, routine tests.

About 143,000 supporting workers were helping the 96,000 research scientists and engineers. This averages about 1.5 technicians to each scientist. Some companies gave each of their research scientists a staff of nine technicians.

The size of the supporting staff "has become a matter of great interest and importance in research management," the report states. This sort of organization helped America over an industrial hump during World War II when skilled men were at a premium.

A crew of non-skilled labor, for instance,

went down the airplane assembly line and "set up" for a welder. Another crew cleaned up behind him. Thus the welder's specialized skill was used to its fullest extent. The welder did not have to waste his valuable time attending to details that are not essential to his job.

Science News Letter, January 9, 1954

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ANTHROPOLOGY

How to Humanize Ape

To change an ape to a human, reshaping its hands, a developed pelvis bone, vocal organs and a different brain anatomy are included in the requirements.

► HERE IS how apes would have to change to make them human, as reported to the American Association for the Advancement of Science meeting in Boston:

1. Remake ape's hands to enable them to use tools and weapons.
2. Develop the pelvis, bone ring that supports spine, to allow them to walk upright.
3. Refine their vocal organs so they could talk.
4. Change the micro-anatomy of brain to produce man's ability for abstraction, symbolism and foresight.
5. Acquire new inborn tendencies toward various kinds of play, which is probably dependent on changes in the micro-anatomy of the nervous system, to improve the chances of developing skills basic to culture.

This idea of what evolution would need to accomplish to make an ape a man was presented by Dr. Keith J. Hayes and his wife, Cathy Hayes of the Yerkes Laboratories of Primate Biology, Orange Park, Fla. In evolving from our pre-human ancestors, humans have made such changes, they believe.

Dr. and Mrs. Hayes "adopted" a baby chimpanzee, Viki, and brought her up as a child in their own home. They taught her to wear clothes, build with blocks and even speak a few words. Viki got along all right even if she lacked the changes necessary to be human.

Advises Study of Apes

Go to the apes and not the human savage to understand man's social development, family and early community life, urged Prof. Earnest Hooton, anthropologist of Harvard University.

Apes living in their natural conditions will tell us more about man's beginning than can backward peoples of the present day, Prof. Hooton told the meeting.

Contemporary "savages" or "uncivilized" people are not primitive people on the evolutionary way up, he explained.

They are "cultural imbeciles or morons," he declared, if we believe our "civilizations" are superior to their rude ways of life. Even if we consider that they are really too smart to "fall for" our higher cultures, then they are that much further from our ancestral prototypes.

What scientists have learned about the family life of the gibbon, and the contrasts between the group and individual life of apes and different kinds of monkeys, he declared, is far more instructive for the history of the prehuman and early human

social development than any of the "stuff on present-day savages written by anthropologists."

Primate Lineage Ancient

The primates, to which order man belongs, have one of the most ancient geological histories, the scientists learned from another report. Only three orders of living mammals are known to have lived longer—the marsupials, the insectivores and the carnivores.

Remains of the primates have been found in North America in rocks dating back to 65,000,000 years ago. These earliest primates were tree-living fruit eaters. Their relationships among themselves, and to the living prosimians of the Old World and the anthropoids of both hemispheres are obscure, Dr. G. L. Jepsen, Princeton University geologist, told the meeting.

Evidence from fossil plants indicates, Dr.

Jepsen said, that the increase in numbers of these prosimians was related to an increase in the temperature in North America. Dwindling in their numbers might have resulted from competition in the great evolutionary upsurge of the rodents.

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NEUROLOGY

Nerve Makes Catfish Regrow Its Whisker

► THE CATFISH'S whisker grows on nerve control, experiments reported to the American Association for the Advancement of Science meeting in Boston show.

These experiments were performed by Robert P. Kamrin, student working with Prof. Marcus Singer of Cornell University.

Key to this and 2,000 other experiments on salamanders reported by Prof. Singer and his students is a delicate, motor-driven hypodermic apparatus designed by Prof. Singer for the work. With this, very small amounts of liquid, less than one-fiftieth of a drop per hour, can be infused into nerves.

The apparatus is used to study the effect of chemicals on growth, growth stoppage and regeneration of nerves. The research is sponsored by the American Cancer Society.

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SHOT IN THE ARM—Salamanders get a dose of the desired chemical at less than one-fiftieth of a drop per hour with the new motor-driven hypodermic apparatus shown here. Designed for research on growth activity by Prof. Marcus Singer of Cornell University, the machine infuses solutions directly into a growth, bypassing the animal's circulatory system. The effect of various chemicals on the salamanders' natural ability to grow new legs has been tested using the new device.

METEOROLOGY

Measure Cloud Droplets

New instrument that uses infrared light to measure the size of droplets as they form in clouds is expected to lead to a better understanding of how and why it rains.

► CLOUDS MAY yield their life histories to a new cloud spectrograph developed by meteorologists at the Massachusetts Institute of Technology.

Dr. Delbar P. Keily, Dr. John C. Johnson, now at Tufts College, and Ralph G. Eldridge reported a one-month successful trial operation of their new equipment for measuring cloud drop sizes on Mount Washington this fall to the American Association for the Advancement of Science meeting in Boston.

The new equipment, developed under sponsorship of the Geophysical Research Directorate of the Air Force Cambridge Research Center, determines the size and number of drops "smaller than have been measured before," Dr. Keily said.

It estimates the size and number of droplets as small as four ten-thousandths of an inch in diameter. A cubic inch of ordinary cloud may contain 500,000 such tiny droplets, each less than one-hundredth the size of the smallest drops in a drizzling rain.

Clouds are formed when invisible water vapor collects into visible droplets of water, at first very small. These tiny droplets, Dr. Keily said, "contain the key to the

mystery of how clouds grow—they are the critical stage in the process by which water in the atmosphere goes from invisible vapor to drops large enough to be rain."

Such tiny drops are believed to exist for a short time; they must either grow larger or evaporate. The new instrument will allow meteorologists to study the behavior of extremely small droplets, closer than ever to the critical sizes that are the true forerunners of raindrops.

The device is called a "variable frequency infrared cloud transmissometer." An electric eye peers through a part of the cloud toward a light source about four feet away, measuring the changes in brightness caused by intervening droplets of the cloud. The light source is invisible "infrared" radiation, since it undergoes large changes on passing through a cloud of very small droplets.

To find the actual sizes of drops, observations of brightness made with the cloud spectrograph must be compared to intensities derived from theoretical data. These theoretical computations were made on M.I.T.'s large electronic computer, Whirlwind I, under Dr. Johnson's direction.

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Obesity, the doctors point out, is a strain on the heart and can aggravate heart disease, making the patient likely to have anginal pain and congestive failure. However, no definite conclusion can be drawn as to whether there is a cause and effect relation between obesity and high blood pressure or heart disease. Patients with either disease who are overweight have twice the mortality of average or under-weight patients.

So, even though it is not clear that being overweight causes heart disease or high blood pressure, it is, the doctors warn, "clearly" important to avoid obesity in heart and blood vessel diseases.

Science News Letter, January 9, 1954

MEDICINE

Warns of Appendicitis Danger with Measles

► IF A child with measles develops pain in the abdomen or any other sign or symptom that might mean appendicitis, he should be watched closely and operated on as soon as the diagnosis is definite.

This advice is given by Dr. W. H. Galloway of the University of Aberdeen and consultant pediatrician to the City Hospital, Aberdeen, Scotland, in the *British Medical Journal* (Dec. 26, 1953).

He bases his warning advice on the cases of seven children who developed measles and appendicitis within the same day or two. One of these children was not operated on for 72 hours after appendicitis developed because he had the measles. The delay was what gave the chance for an abscess to form and peritonitis to set in, the surgeons and Dr. Galloway think.

Measles and appendicitis are both common childhood diseases, but when they come together it is not just a matter of chance. The measles, in Dr. Galloway's opinion, probably starts the infection of the appendix.

Sometimes the appendicitis develops before the typical measles rash. Sometimes it comes after. Either way, it is dangerous, Dr. Galloway warns, to delay operation.

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ICHTHYOLOGY

Blood-Sucking Blonde Exhibited to Scientists

► A FATAL blood-sucking blonde swished into the American Association for the Advancement of Science meeting in Boston, billed as the only albino lamprey in existence, alive or dead.

Exhibited by Prof. Francis H. Wilson of Lebanon Valley College, Pa., this creature was discovered Aug. 12 in Lake Champlain as a larva of the land-locked form of the sea lamprey. It metamorphosed into an adult with no pigment in its skin and with pink eyes. Like famous Moby Dick, the albino whale, it is extremely rare.

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MEDICINE

Sex Mystery in Obesity

► A DIFFERENCE between the sexes in relation to heart disease, high blood pressure and overweight is giving medical scientists a new mystery to solve.

The mystery appears in a report by Drs. Arthur M. Master, Harry L. Jaffe and Kenneth Chesky of New York to the *Journal of the American Medical Association* (Dec. 26, 1953).

The doctors do not call it a mystery, but refer to it as a "surprising finding," the reason for which is "not obvious."

The mystery, briefly, is this: Overweight occurs more often in men with high blood pressure and with three kinds of heart disease than among the general population. In women, on the other hand, obesity is not more frequent in patients with high blood pressure and the three kinds of heart disease than in the general population. But after the age of 40, women in the general population are definitely more obese than men.

The New York doctors used new limits for normal blood pressure and new weight tables in their study. They classify as obese persons 25% or more above average weight,

while those 10% to 24% above average are classed as overweight.

The three kinds of heart disease they investigated are angina pectoris, acute coronary insufficiency that occurs when the flow of blood to the heart muscle is not enough to meet the demands, and coronary occlusion, which is a blockage of one or more of the arteries supplying the heart.

The ratio of overweight among 100 men with angina pectoris to the general population was 39 to 20. The proportion of overweight men among 113 with coronary insufficiency was again almost double that in the control group, 39% to 20%. Men with coronary occlusion also showed, before the attack, a definite increase in frequency of overweight (33% to 14.8%) and of obesity (16% to 5.3%) compared to the controls.

Among 118 men with essential hypertension, or high blood pressure, the ratio of overweights to those in the general population was 32.2% to 14.8%. The proportion of distinctly obese men, 25% or more over average weight, was, however, the same in the high blood pressure and control groups, 6% to 5.8%.



42,000,000,000,000,000 MILES AWAY—The giant spiral nebula, M-81, whose distance on the new scale has just been found to be doubled, is shown here as photographed with the 200-inch Hale telescope on Mt. Palomar.

ASTRONOMY

Double Distance to M-81

► THE STAR system, or spiral nebula, M-81 in the constellation of Ursa Major, the great bear, is about twice as far away from the earth as astronomers recently had thought.

Dr. Allan R. Sandage of Mount Wilson and Palomar Observatories reported this new distance in a paper delivered at the American Astronomical Society meeting in Nashville, Tenn.

Three different "yardsticks," he said, were used to find the distance to this great aggregation of stars, which resembles our own Milky Way galaxy. The M-81 nebula, he reported, is about 7,000,000 light years from us, one light year being the distance light travels in one year, or 6,000,000,000,000 miles.

The three types of stars used as "yardsticks" to find distances to star systems beyond the Milky Way are Cepheid variables, irregular variables and novae, or exploding stars. Dr. Sandage's correction for the distance to M-81 is in addition to the recent doubling of distances to all extra-galactic objects.

His finding, Dr. Sandage said, does not mean that the distances to other far-away objects in the universe must be increased correspondingly. Messier 81 may be an exceptional case, and extensive research in other nebulae is needed before any general

effect on the cosmic distance scale can be established.

The M-81 result does establish, however, Dr. Sandage said, that corrections for errors in apparent magnitudes may be necessary for other nebulae, possibly varying from nebula to nebula.

The new value could be determined because more accurate standards of apparent magnitudes have been determined photoelectrically by Dr. William A. Baum, also of the observatories.

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ASTRONOMY

Spot New Nova in Magellanic Cloud

► A NEW nova has been spotted in the Small Magellanic Cloud, our nearest neighbor galaxy visible only from the Southern Hemisphere. Dr. Henry J. Smith of Harvard College Observatory's Boyden Station, Bloemfontein, South Africa, reported the discovery to the American Astronomical Society meeting in Nashville, Tenn.

The nova, too faint to be seen by the naked eye, blazed forth suddenly, then faded until it was less than 600 times as bright as when first found.

Science News Letter, January 9, 1954

RADIO ASTRONOMY

Two New Radio "Stars" Discovered in Our Galaxy

See Front Cover

► DISCOVERY OF two new radio "stars" in our galaxy was reported to the American Association for the Advancement of Science meeting in Boston by Fred T. Haddock of the Naval Research Laboratory, Washington, D. C.

The measurements, the first successful at the very short wavelength of nine centimeters, were made at the laboratory with the 600-inch radio telescope, a huge metal "saucer" shown on the cover of this week's SCIENCE NEWS LETTER. Nine centimeters is about four inches, compared to wavelengths of about 1,000 feet for frequencies in the middle of the standard broadcast band.

One of the new radio sources, described by Mr. Haddock as a "nebula," is in the Great Nebula of Orion, a familiar winter constellation now visible in the southeastern sky. There are three stars in a row that form the belt of Orion, the warrior, and the Great Nebula's place is marked by the middle star of the three. The Great Nebula in Orion is the biggest and brightest of the nebulae in the heavens.

The other nebula discovered by Mr. Haddock and his co-workers, including Cornell H. Mayer and Russell M. Sloaneaker Jr., is the "Swan" nebula, not to be confused with the constellation, Cygnus, the swan.

All of the objects so far spotted at the nine centimeter, or 3200 megacycle, range have been identified with visible objects, but the only two new sources so far discovered at this short wavelength, and not previously discovered at other wavelengths, are the Orion and Swan nebulae.

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ASTRONOMY

Find New "Brand" Of Meteor Shower

► A NEW "brand" of meteor shower has been discovered from photographic observations of the Delta Aquarids, Drs. Fred L. Whipple and L. G. Jacchia and Miss Frances W. Wright of Harvard College Observatory revealed at the American Astronomical meeting in Nashville, Tenn.

These meteors, which are observed each year from mid-July to mid-August, move in a highly elongated, or cigar-shaped, orbit around the sun, the Harvard astronomers reported. Such a path is quite unlike the orbits of other meteor swarms.

At their nearest point to the sun, the Delta Aquarids are only 5,500,000 miles from the sun's surface, and its intense heat raises their temperature to nearly 1,100 degrees absolute, or 1,500 degrees Fahrenheit. When they are farthest from the sun, the meteors are near the orbit of Jupiter.

Science News Letter, January 9, 1954

ASTRONOMY

Stars May Throw Off Cosmic Rays

► THE POWERFUL cosmic rays continuously bombarding the earth from space may be material thrown off from rotating stars with strong magnetic fields, Dr. Armin J. Deutsch of Mount Wilson and Palomar Observatories suggested to the American Astronomical Society meeting in Nashville, Tenn.

Such stars, known to astronomers as spectral class A, are about 100 times as luminous as the sun, and have a mass two or three times that of the sun.

Dr. Deutsch's theory is that if an atom of interstellar hydrogen came very close to such a star, as close as ten times the radius of the star itself, the light energy of the star could split the hydrogen atom into the electron and proton of which it is composed.

Because of the star's strong magnetic and electric fields, the two particles, in just six seconds after their separation, would pick up energies of over 1,000,000,000 volts by moving a distance of one stellar radius along the star's lines of force.

Some of these energetic particles, Dr. Deutsch believes, might move out into space, where they would be further speeded up to become the powerful cosmic rays.

Science News Letter, January 9, 1954

VIROLOGY

Virus Involved in Change Of Normal Cell to Cancer

► TRANSFORMATION OF a normal cell to a cancer cell involves the production of a virus, according to evidence presented at the meeting of the American Association for the Advancement of Science in Boston.

This does not mean, however, it was emphasized, that cancer is contagious.

Leukemia, cancerous disease of the blood forming organs, can be induced by a virus filtered from cancerous blood, Dr. Sarah E. Stewart of the U. S. Public Health Service Hospital, Baltimore, reported. This virus can localize not only in blood cells, but under some conditions in other cells as well and, thereby, produce new types of cancer.

Cancer viruses can be changed by their hosts, that is, the bodies in which they live and grow, studies reported by Dr. Kenyon S. Tweedell of the University of Illinois show.

Dr. Tweedell studied a cancer which is common in kidneys of frogs of northern Vermont. These cancers yield a virus that will localize in normal kidneys and transform them to the same kind of cancer. However, the virus does not have this effect in frogs from another geographic area. The same species of frogs from New Jersey, Wisconsin, Illinois and Kentucky are never affected by Vermont virus.

In time, however, a Vermont cancer

grafted into the eye of a Wisconsin frog, after growing slowly will regress and almost fade away. Then it starts growing again. The new growth has in it a virus trained to induce cancer in kidneys of Wisconsin as well as Vermont frogs. If it fades away a second time and regrows again, it can attack other organs as well as the kidneys.

This host-induced adaptation of a cancer virus gives scientists a little better understanding of the relationships between the host cell and its directors. Apparently under normal conditions the directors, which are within the cell and are probably nucleoprotein chemicals, govern the growth and differentiation of normal tissues. It is now believed that it is only when they become faulty that they direct abnormal growth and differentiation, and then are recognized as viruses.

Science News Letter, January 9, 1954

PUBLIC HEALTH

Smog Deaths Partly Due to Two Chemicals

► THE DEADLY effect of smog, which killed 4,000 in London in one month last year and 20 in Donora, Pa., in 1948, can be partly explained by the interaction of sulfur dioxide and sulfuric acid mist.

Guinea pig studies showing this were reported by Dr. Mary O. Amdur of Harvard School of Public Health at the meeting of the American Association for the Advancement of Science in Boston.

When guinea pigs breathed air contaminated with these two substances together, they had trouble breathing within the first hour. The breathing difficulty got progressively worse as the exposure continued. Frothy fluid appeared in the nose and mouth. The labored breathing, "surprisingly," continued for one or two days after the animals were breathing fresh air again.

By contrast, when the animals breathed air contaminated only with sulfuric acid mist, at a concentration capable of producing severe breathing trouble and of killing half the animals or more in eight hours, the survivors breathed normally within two hours after the exposure ended with a few rare exceptions.

In the experiments, the concentrations of sulfuric acid mist and sulfur dioxide breathed by the animals were so small that each by itself caused little or no symptoms of breathing trouble, no loss of weight and only moderate lung damage.

The combination, however, not only made it very hard for the animals to breathe, but also made them stop growing and caused severe, extensive lung damage.

Dr. Amdur stressed that, in the studies reported, only one concentration of the chemicals and only one exposure time of eight hours were used. The results, therefore, must be considered preliminary although the effect of the combination of sulfur chemicals is "so striking."

Science News Letter, January 9, 1954

IN SCIENCE

GENERAL SCIENCE

Left Side of Newspaper Front Page Read First

► OVER THREE-QUARTERS of the readers of daily newspapers look first at the left side of the front page, despite the fact that a large number of editors place what they consider the most important stories and pictures on the right side.

This discovery, made using the photoelectric eye camera, was reported by Dr. Herman F. Brandt, director of the Institute of Visual Research, Chicago, to the American Association for the Advancement of Science in Boston.

The ocular patterns of a hundred subjects, 50 male and 50 female, were recorded. They first looked at a symmetrical design the same size as a newspaper folded. Then they viewed an actual newspaper. Of them, 78% looked first at the left side. They divided their first 15 seconds of reading time 59.6% to the left side and 40.4% to the right for the top half of the front page, and 57.6% to the left side and 42.4% to the right side for the lower half.

Editors of 100 newspapers in all 48 states were asked to tell how they believed readers read their front pages. Sixty of them replied and answered: upper left, 20%; upper right, 35%; about equal, 45%. For the first 15 seconds of reading, the editors' guesses were: left side, 8.3%; right side, 36.7%; about equal, 55%.

Science News Letter, January 9, 1954

MEDICINE

Dye Lights Up Disease Fighting Plasma Cells

► THE GLOW of a fluorescent dye has let scientists see where disease-fighting antibodies are formed in the body and at the same time, has cleared the long-time mystery of what the "plasma cell" does in the body.

The plasma cell and its ancestors are responsible for antibody formation, Drs. Elizabeth H. Leduc, Albert H. Coons and Jeanne M. Connally of Harvard Medical School reported at the meeting of the American Association for the Advancement of Science in Boston.

They made their discovery by injecting diphtheria toxoid under the skin of rabbits. Then they added a fluorescent dye that combines with the diphtheria antibodies. This let them see the cells in which the antibody was forming in response to the toxoid.

The plasma cells that form the antibodies exist in the filters of lymphatic tissue such as tonsils, adenoids and lymph glands.

Science News Letter, January 9, 1954

CE FIELDS

MEDICINE

USAF Mike Adapted to Save Polio Patients

► A STANDARD U. S. Air Force microphone has been adapted to give life-saving warning when polio patients are threatened by obstruction of the airway from nose and throat to lungs.

It has been tried out in two epidemics and "proved to be of the greatest value," Dr. F. D. Stott of the electro-medical research unit, Medical Research Council, and the Stoke Mandeville Hospital, Aylesbury, reports in the *British Medical Journal* (Dec. 26, 1953).

The airway obstruction must be removed at once or the patient will suffocate. Continuous watch must be kept over patients with the bulbar form of polio to detect such obstruction at the earliest moment. However, even experienced nurses, especially if there is much other noise in the ward, may not immediately catch the bubbling sound caused by obstruction of the airway.

So Dr. Stott adapted the laryngeal mike with an amplifier and loudspeaker attachment. The mike is placed over the patient's larynx in the neck and held in place by an elastic band. If the patient is in the prone position, the mike can be put on the back of the neck, over the temple or the back of the head, where sounds will be picked up by bone conduction.

The volume is adjusted so that the intermittent rushing sound produced by normal breathing is just audible without being obtrusive. Under these conditions the bubbling sound produced by obstruction of the airway is loud enough to draw attention from the far end of the ward.

Science News Letter, January 9, 1954

GENERAL SCIENCE

Harness Electron To Guide Blind Persons

► BLIND PERSONS some day may be able to walk with certainty through unfamiliar territory without the aid of seeing-eye dogs or canes, scientists foresaw at the American Association for the Advancement of Science meeting in Boston.

Clifford M. Witcher of the Massachusetts Institute of Technology revealed a device that has been built at MIT to warn its blind user of obstacles and potential hazards, such as curbs. The handle is used to transmit the warning to the blind person. When an obstacle is coming into "range," stimulator points on the handle press against the user's fingers.

Mr. Witcher suggested that the entire handle could be made to vibrate at a high frequency when the blind person came

nearer to the obstacle, and that a strong, low frequency vibration could indicate a step-down at a curb.

Thomas A. Benham of Haverford College, Pa., reported that a "seeing-eye cane" developed by the U. S. Army Signal Corps has been tested, and that the principles it embodies have been found to be sound. The device itself, however, still needs to be improved.

Carried like a lunch pail, it shoots out a beam of light that is reflected by obstacles. The reflected light is picked up by a built-in optical reception system. A vibrator in the handle translates the reflections into warnings and reassurances for the user.

Blind users reported they had some difficulty in remaining attentive to the continuous vibrating signals put out by the sensory aid. They also had some difficulty in spotting curbs.

Scientists now hope to improve the device. A transistor laboratory model already has been found to offer numerous improvements over the original version.

Science News Letter, January 9, 1954

MEDICINE

New Kind of TV Helps Nervous Heart Patients

► A NEW kind of TV developed to help nervous persons learn to relax and thus ease the strain on their hearts was announced by Dr. Edmund Jacobson of Chicago at the meeting of the American Association for the Advancement of Science in Boston.

The apparatus, Dr. Jacobson said, "for the first time in history brings up the nervous state of the individual with all the clearness of the television screen."

He calls it "neuromuscular television." It gives the patient a visible record of the tension of his muscles and nerves even when he thinks he is relaxing. Then he can see the change when he really does relax.

With or without attendant emotion, overeffortful living is equivalent to habitual, prolonged moderate activity of muscles, Dr. Jacobson finds. This, he thinks, causes the heart to work protractedly with resultant wear and tear and damages the arteries of the heart.

The first sign of change is spasm of the overworked artery. The patient then feels chest distress, which he perhaps ignores. With continual overdrive of the human organism, changes natural in aging arteries are accelerated. In consequence of increasing sclerosis (hardening), the blood supply is increasingly impaired and, accordingly, the heart fails to respond adequately to the requirements of the patient in his excessive adjustments to his environment.

Unless these requirements are diminished appropriately, later stages, Dr. Jacobson declared, are marked by stoppage of the artery, the so-called "heart attack" that often results in death.

Science News Letter, January 9, 1954

PSYCHOLOGY

Skid Row Drunk May Not Be an Alcoholic

► THE SKID row derelict may not be an alcoholic, popular opinion to the contrary.

This social outcast, like the stage or screen comedian, may exhibit drunken behavior, but that does not mean that they are alcoholics, Dr. Raymond G. McCarthy of Yale University Center of Alcohol Studies, New Haven, pointed out at the meeting of the American Association for the Advancement of Science in Boston.

A distinction must be made between drinking and alcoholism, he declared. Alcoholics can be found in every walk of life and so can people who drink and get drunk. The only two signs that can be applied to all alcoholics, except that they are not abstainers, Dr. McCarthy thinks, are these: 1. the use of alcohol associated with a kind of discomfort; 2. the inability to control its use once begun.

Many people, he pointed out, use alcohol on purpose to relax, to get a mild sedative effect, to make life with all its tensions and difficulties more acceptable. However, they do not lose contact with reality, they still recognize that life is difficult, they can stop drinking, and their drinking does not involve them in further difficulties. These are not alcoholics.

The alcoholic uses alcohol to achieve a change in reality, not just to be able to accept it more easily. And there are always, Dr. McCarthy emphasized, involvements of family life, jobs and physical complaints associated with the alcoholic's drinking.

Science News Letter, January 9, 1954

MEDICINE

Male Hormone Triggers Mice Fighting Behavior

► INJECTION OF a single hormone can in some cases trigger an entire pattern of behavior much earlier than normal, Dr. John A. King and Joel Victor Levy, Jackson Memorial Laboratory, Bar Harbor, Me., reported at the American Association for the Advancement of Science meeting in Boston.

Young male fighting mice do not usually begin fighting until they are about 34 days old, when male sex hormones are believed to be actively secreted into the blood stream.

After injections of the male sex hormone, testosterone propionate, the young mice began scrapping as early as 18 days. Fighting is a complicated pattern of social behavior, the scientists pointed out, requiring a certain level of physical and mental development.

This stage of development is evidently reached by the mice as early as 18 days of age and needs only the injection or secretion of the male hormone to set it in motion.

Science News Letter, January 9, 1954

TECHNOLOGY

Moving the Masses

With American cities becoming clogged with vehicles and pedestrians, the transportation problem is growing acute. Los Angeles to combat congestion with a new monorail train.

By ALLEN LONG

► SINCE PREHISTORIC time, man has been concerned with moving himself from one spot to another. To get where he has wanted to go, man has used his feet, animals, sleds, carts, buggies, trains, automobiles, ships and airplanes.

Now in the 20th Century, man still has transportation woes. Our streets are clogged with cars. Suburban living has added to the difficulty of getting between home and work. Congestion slows our moving around.

To solve his moving problems, man today is experimenting with monorail trains, gyroscopic buses, conveyor-belt subways, piggy-back helicopters, automatic elevators with "brains" and propeller-driven sleds.

Los Angeles, for instance, has received approval from the California legislature to build an overhead monorail system to San Fernando 44 miles away. When completed, it will be the second of its kind in the world.

With the bottoms of its cars dangling at least 16 feet above street level, the electric train will whisk passengers from downtown Los Angeles to Van Nuys in 28 minutes, allowing for nine station stops en route. Although Van Nuys is only 15 miles away, heavily populated suburbs lie between it and the big city. Buses require 63 minutes to make the trip.

Patterned After German Model

The Los Angeles monorail is to be patterned after its German predecessor. This 52-year-old overhead railroad supports pendant cars that shuttle between Elberfeld and Barmen in the Ruhr district. It has carried 310,000,000 passengers without a single fatality traceable to its unique design.

Plans for the Los Angeles system call for a top train speed of 100 miles an hour. Each car in the train will seat 60 and provide standing room for 40. In operation, it will streak along its gleaming rail quietly and with no vibration. There will be no danger of collision with automobiles, trucks or buses.

Its operating cost will be low: a 10-car monorail train requires a crew of only one motorman and two "guards." Car and engine replacements will be virtually nonexistent. Maintenance costs will plunge to a new low.

Many Los Angeles residents have wondered why such a railroad has not been installed before now. Executives of Monorail Engineering and Construction Corpora-

tion and the Southern California Monorail and Transit System, backers of the proposed venture, reply that subways and elevated lines have been adequate until recently but now are heavily taxed. The monorailroad seems the best remedy.

In Akron, engineers at the Goodyear Tire and Rubber Company, working with officials of the Stephens-Adamson Manufacturing Company, have created a conveyor belt subway designed to replace shuttle subways in congested cities. A working model was built, tested and found satisfactory.

Passengers step on an endless conveyor belt moving one and a half miles an hour—half the speed at which many persons walk. They enter large, closely spaced cars moving at the same speed next to the belt.

The cars, each seating 14 persons, "run" underground on conveyor belts, except at acceleration and deceleration points where banks of rubber-tired wheels serve as the conveyor.

At top speed the cars travel only 15 miles an hour. However, the "batching" characteristic of subways is absent since there

always is a string of empty cars waiting to pick up passengers. Because of this, more persons can be transported during rush peaks than some subways can handle.

Officials of the two companies point out that a nine-foot-wide belt can carry 16,000 persons an hour with no stopping, waiting, jamming or shoving. They have suggested the conveyor system offers a better way of serving 80 car-clogged blocks in downtown Cincinnati, and would provide better shuttle service between New York's Grand Central Station and Times Square.

Spinning Flywheel for Energy

Trolley buses have proved their worth, but small towns frequently cannot afford the large capital outlay required to put up the trolley wires. To get around this, a Swiss engineering firm has produced a "gyrobus" that runs on electrical energy stored in a spinning flywheel.

Before beginning the run, the motorman presses a button to raise contact rods on the bus to an electrical station serviced with commercial three-phase electricity. Within three minutes, a powerful little motor brings the 3,300-pound flywheel up to 3,000 revolutions a minute.

The contact rods are lowered and the



CONVEYOR-BELT TRAIN—Pretending they are harassed New Yorkers, these Aurora, Ill., citizens try out a prototype endless train of cars that runs on conveyor belts instead of rails. Such trains are said to hold many advantages over today's short shuttle subways.

motor attached to the flywheel becomes a generator. It feeds motors attached to the gyrobus' wheels and can power the bus at 30 miles an hour for about three miles without "recharging." Passengers enthusiastically report the bus provides a vibrationless, noiseless, odorless ride.

Strap-on piggy-back helicopters some day may lift soldiers high into the air and drop them quietly behind the enemy's lines. A 65-pound "heliglider" now is being developed by Bruno Nagler, 51-year-old Austrian engineer who has taken up quarters at New York's Westchester County Airport.

Powered by pairs of rockets that go off in series, the heliglider climbs like a helicopter and comes down dead-ended, its thrashing 15-foot rotor blades braking the fall. A kite-like rudder sticks out in the rear to prevent the airborne user from twirling like a top. By adjusting the rudder and the angle of inclination of the swishing rotor, the soldier can select the direction in which he will glide back to earth.

Although he is still perfecting his invention, Mr. Nagler states that a soldier probably will be able to drift five miles at 50 miles an hour from an altitude of 10,000 feet.

Another up-down apparatus has been created to speed businessmen quickly to and from their floors in tall office buildings. It is the Otis "autotronic" elevator.

Operatorless Elevators

Working from a small electronic "brain," a bank of operatorless autotronic elevators "knows" when almost everyone is going "up" in the building. Thus at 8:30 in the morning, the elevators give heavy preference to "up" traffic, but at quitting time, preference goes to "down" traffic. Similarly, they have other operational personalities during coffee breaks and lunch periods.

The idea is to make automatic elevating more efficient. The new system capitalizes upon the ability of electronics to make fewer errors in judgment than human operators.

The blowmobile was the answer of a Seabee outfit to slippery snow-covered ground that made walking difficult around Point Barrow, Alaska, during the winter of 1952.

Dubbed the "It Won't Work," the blow-

mobile nevertheless did work and skied across glistening snow at 45 miles an hour. It was powered by an airplane propeller driven by a 95-horsepower automobile engine. Similar sleds have cropped up previously to serve other persons having transportation problems on ice and snow.

These devices are some of the unusual forms of transportation that man has created so far to help him get around. Do they represent the ultimate of man's ability to develop ways and means of offsetting his human handicaps? Or are they merely the forerunners of new, almost fantastic transportation modes which lie just beyond the horizon?

Science News Letter, January 9, 1954

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Books of the Week

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THE ADVANCEMENT OF SCIENCE: Vol. X, No. 38—Sir Edward Appleton and others—*British Association for the Advancement of Science*, 143 p., illus., paper, 7s. 6d. Contains addresses delivered at the annual meeting of the British Association in Liverpool in 1953.

AUGUSTINE TO GALILEO: The History of Science A. D. 400-1650 — A. C. Crombie—*Harvard University Press*, 436 p., illus., \$8.00. Presenting a short history of the science during the period that connects the classical with the modern world.

AVIATION FACTS AND FIGURES 1953: Rudolf Modley and Thomas J. Cawley, Eds.—*Lincoln Press*, 224 p., \$5.00. A statistical yearbook of the Aircraft Industries Association.

CULTURAL PATTERNS AND TECHNICAL CHANGE: Margaret Mead, Ed.—*UNESCO (Columbia University)*, 348 p., paper, \$1.75. Reporting results of a survey motivated by the desire to ease the tensions attendant upon the introduction of new ways of life and work among people who are not ready for them.

DIRECTIVAS EN LA PREPARACION E PUBLICACION DE SYNOPSIS: Division de Interlingua, Science Service—*Science Service*, 2 p., paper, free upon request to author, 80 East 11th St., New York 3, N. Y. An Interlingua translation of UNESCO document NS 51.D.10A/05.XL.51 on the preparation and publication of abstracts.

THE DISPOSAL OF THE DEAD: C. J. Polson, R. P. Brittain and T. K. Marshall—*Philosophical Library*, 299 p., \$7.50. Intended particularly for the inexperienced funeral director, this book describes the customs of various religions and groups as well as legal requirements, and gives the historical background. Of British authorship.

GROWING TREES IN A FREE COUNTRY: Forest Industries Council—*American Forest Products Industries*, 21 p., illus., paper, free upon request direct to publisher, 1816 N Street, N.W., Washington 6, D. C. A statement of the forest policy of the Forest Industries Council for the effective management and renewal of the privately owned woodlands of America.

GUIDE TO AUDIO REPRODUCTION: David Fidelman—*Rider*, 232 p., illus., paper, \$3.50.

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HIGH ALTITUDE ROCKET RESEARCH: Homer E. Newell, Jr.—*Academic Press*, 298 p., illus., \$7.50. This work by the head of the rocket-sonde research branch of the Naval Research Laboratory is concerned not so much with space travel as with the use of this modern device to study the upper atmosphere, the ozone layer, the ionosphere and cosmic rays.

HOW TO LIE WITH STATISTICS: Darrell Huff, 142 p., illus., \$2.95. These directions on how to misuse statistics also serve to make the reader critical of misleading figures.

INTERMEDIATE ALGEBRA FOR COLLEGE STUDENTS: Thurman S. Peterson—*Harper*, rev. ed., 369 p., \$3.25. A text for college students who have had not more than one year of secondary school algebra. A terminal course for non-science students, and a foundation for those who plan to take more advanced mathematics.

ION EXCHANGE RESINS IN MEDICINE AND BIOLOGICAL RESEARCH: Harry Sobotka and others—*New York Academy of Sciences*, 262 p., illus., paper, \$4.50. These papers, which were presented at a special conference, describe the use of this new technique in diagnosis and research.

KEEPING AND BREEDING AQUARIUM FISHES: C. W. Emmens—*Academic Press*, 202 p., illus., \$4.50. Telling the hobbyist how to maintain a balanced aquarium and how to know the fishes he breeds or cares for.

MATH IS FUN: Joseph Degrazia—*Emerson Books*, 159 p., illus., \$2.75. A collection of puzzles and mathematical games and amusements.

METHODS FOR EMISSION SPECTROCHEMICAL ANALYSIS: ASTM Committee E-2 on Emission Spectroscopy—*American Society for Testing Materials*, 309 p., illus., paper \$4.50, cloth \$5.15. The first extensive compilation on emission spectrochemical methods presenting the pertinent information to permit its application in various laboratories.

MOTOR SERVICE'S NEW AUTOMOTIVE ENCYCLOPEDIA: Complete Course in Automotive Mechanics With Special Emphasis on Fundamental Principles, Trouble Shooting—William

E. Toboldt and Jud Purvis—*Goodheart-Willcox*, 768 p., illus., \$7.95. Intended for both inexperienced and experienced mechanics and car owners, and containing specifications for cars made from 1928 to 1953.

PAYING FOR MEDICAL CARE IN THE UNITED STATES: Oscar N. Serbin, Jr.—*Columbia University Press*, 543 p., \$7.00. The people of the United States spent over \$11,000,000,000 on illness in a single year. Here is a study of how the money was applied and what proportion was laid aside in advance in medical prepayment plans.

THE SHAPING OF THE MODERN MIND: The Concluding Half of Ideas and Men: Crane Brinton—*New American Library*, 287 p., paper, 35 cents. Explaining the ideas of men who have shaped the course of history.

SILICONES AND THEIR USES: Rob Roy McGregor—*McGraw-Hill*, 302 p., illus., \$6.00. Bringing together and correlating the scattered and confusing information about this important family of chemicals and what they can do. Intended as a non-technical manual for engineers and others making use of silicones.

UHF TELEVISION ANTENNAS AND CONVERTERS: Allan Lytel—*Rider*, 118 p., illus., paper, \$1.80. To prepare dealers and servicemen to answer the questions of owners, and to service and install these units.

THE WORKER SPEAKS HIS MIND ON COMPANY AND UNION: Theodore V. Purcell—*Harvard University Press*, 344 p., illus., \$6.00. A priest who lived for a year and a half in the stockyards community writes this book about the attitudes and opinions of Swift and Company workers as expressed to him in numerous talks.

Science News Letter, January 9, 1954

BIOCHEMISTRY

New, Unidentified Acid Found in Brain

► DISCOVERY OF a new, unknown acid in the brain is announced in *Nature* (Dec. 26, 1953) by three American scientists, Drs. F. Friedberg, L. M. Marshall and L. H. Newman of Howard University Medical School, Washington.

The acid contains 54.3% carbon and 10.4% hydrogen. It was found by the partition chromatography method of separating chemicals in a mixture. Silica gel was used as the medium for the separation.

Science News Letter, January 9, 1954

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Photo resist



That's a circuit for an item of electronic gadgetry you see here, printed on a bit of limp glass-fiber cloth. It was made by 1) laminating a sheet of copper foil over the cloth, 2) coating a light-sensitive acid resist over the foil, 3) exposing to light through a photographic negative of a drawing of the circuit, 4) washing away the resist where the opaque areas of the negative prevented it from hardening, and 5) etching away the foil where the remaining resist did not protect it.

Printed circuits *per se* are no longer newsworthy. The kind of printed circuit news that is interesting today is of ways to turn them out more efficiently. If, for example, the light-sensitive material could be deposited on the foil-laminated support months in advance instead of just before exposure, the whole process would be considerably streamlined. If the exposure time required could be drastically reduced, that too would help. If atmospheric changes did not affect that exposure time, there would be less spoiled work.

It so happens that we have just placed on the market a material called *Kodak Photo Resist* which fulfills these conditions. It can be conveniently and quickly processed in a tray. It can also be processed in an ordinary vapor degreaser, with the usual trichloroethylene solvent. It can be dyed. It resists all commonly used acids and alkalies. It resists cyanide plating baths. It requires no "burn in" to adhere to metal. It contains no chromium salts, which are known sometimes to irritate the skin. It is not based on bichromated gelatin, silver halides, or diazo dyes. As a matter of

fact, it is based on a photosensitive substance never previously used.

Possibly a few miscellaneous souls other than the photoengravers, photolithographers, color-TV-tube makers, circuit printers, and nameplate makers we had in mind will be glad we took the trouble to work it out.

Kodak Photo Resist, Kodak Photo Resist Developer, and Kodak Photo Resist Dye, along with complete directions for use, are sold by a Kodak Graphic Arts dealer in your vicinity. For help in locating him, write Eastman Kodak Company, Graphic Arts Division, Rochester 4, N. Y.

Kodapak Sheet

Since plasticized cellulose ester sheeting finds use in many technologies even more complex than manufacturing the familiar orchid box, we have just put out a newly revised pamphlet in which we tabulate a great many of the mechanical, optical, thermal, chemical, and electrical properties of the various forms of *Kodapak Sheet*. The gist of it is that *Kodapak Sheet*, which may be readily formed by means of heat and pressure, cemented, or high-frequency sealed, is quite a versatile material.

You can obtain a copy of "Properties of Kodapak Sheet" by writing Eastman Kodak Company, Cellulose Products Division, Rochester 4, N. Y.

Microprint

It's the brutal truth that a man or woman is covering a narrow field indeed if he or she can honestly claim to be abreast of all that's set down on paper about it. A remedy—microprint cards—has been proposed by which a library card catalog can replace the library itself. Almost a decade of development has demonstrated its merit. Since it is based on photography, the time has come to state our position on it:

Before 1954 ends, you will be able to walk into dealers' establishments throughout the United States and be shown the *Kodagraph Microprint Reader*. This is an instrument, weighing less than a standard typewriter, for reading microprint cards with complete comfort. Microprint cards,

usually the standard 3" x 5", look like the familiar library catalog card, carrying classification data, perhaps a brief abstract, etc., but, instead of having them to locate the item catalogued if it seems pertinent, it's right there on the back of the card in microprint—as many as 60 pages of the actual text.

"Complete comfort" is very important. Without it there would be no spreading of microprint readers from large libraries to smaller ones, and on down to the individual user's office, desk, and even home. With large numbers of users to share the cost, microprint card literature will become vastly more extensive and intensive than it has already grown. Economic barriers to the development of automatic subject-searching equipment will fall. New microprint publishing ventures will flourish—some for profit, some for the



promotion of scholarship in fields too sparsely inhabited to support the cost of conventional publication. More industrial organizations will establish microprint systems for the debulking, speedy dissemination, and storage of private internal data as well as current publication in fields of special interest to the organization.

Our part is to work closely with everybody, supplying technical hints, *Kodagraph Micro-File Film*, *Kodagraph Microprint Paper*, and equipment to turn out microprint cards by the piece or by the peck.

If the possibilities of microprint interest you, we'd appreciate your dropping a note to Eastman Kodak Company, Industrial Photographic Division, Rochester 4, N. Y., to let us know the nature of that interest.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are... serving laboratories everywhere

Kodak
TRADEMARK

To people who want to write but can't get started!

Do you have that constant urge to write but fear that a beginner hasn't a chance? Then listen to what the former editor of *Liberty* said on this subject:

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Questions

ANTHROPOLOGY—What would be needed to humanize an ape? p. 21.
□ □ □

GENERAL SCIENCE—What was the total bill for research in the U. S. in 1952? p. 20.

Which side of a newspaper is read first? p. 24.
□ □ □

MEDICINE—What is the danger of stomach pains when a child has measles? p. 22.
□ □ □

PSYCHOLOGY—What are two signs that can be applied to all alcoholics? p. 25.
□ □ □

PUBLIC HEALTH—How can part of the deadly effect of smog be explained? p. 24.
□ □ □

Photographs: Cover, Naval Research Laboratory; p. 19, Lockheed Aircraft Corporation; p. 21, Cornell University; p. 23, Mt. Wilson and Palomar Observatories; p. 26, Goodyear Tire and Rubber Company; p. 32, Bakelite Company.

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MEDICINE

Before and After X-rays Give Identity of Dead

► AN AID to the identification of dead bodies comes from before and after X-ray pictures.

Success with the first large-scale use of this method was reported by Dr. T. C. Brown of the University of Toronto at the meeting of the American Association for the Advancement of Science in Boston.

The X-ray identification technique showed its value when scientists were faced with the task of identifying 119 bodies, most of them mutilated beyond recognition, after the burning of the pleasure steamship, *Noronic* in Toronto harbor in 1949.

National registration of dental data, though it would cost more than the same registration for fingerprints, might prove valuable in identifying dead bodies, Dr. James M. Dunning of Harvard School of Dental Medicine declared.

The teeth are not only among the most resistant structures in the human body, but also among the most distinctive, he noted.

Since we do not have national registration of dental data, he urged dentists to record conditions of all teeth in their patients as well as of the teeth they have filled or otherwise "restored," and to keep the most recent X-ray surveys of their patients.

At least half a dozen anthropologists in this country have been active in helping police identify dead bodies, Dr. Edward E. Hunt of Harvard University and the Forsthoft Dental Infirmary for Children reported.

Sex can be told from measurements of hip bones, he said. Whether bones are human or animal, whether too ancient to be of legal significance, whether child or adult, and even in some cases race and geographic origin can be told from an anthropologist's study.

Science News Letter, January 9, 1954

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SPARROW

**Sleuthing for Birds**

► BIRDS VISITING your garden in search of food can easily be identified by the tracks they leave. Although such tracks can be found in sand or soil, they are seen most plainly in freshly fallen snow.

You do not have to live in the country to recognize the prints of wild creatures. In almost every garden and yard, however small, you can find the prints of a few birds, if you look for them. Visitors may come and go unknown to you, but they always leave their calling cards in the snow.

The lone print of a woodpecker at a feeding station may be a tell-tale sign that the bird made a brief appearance, but found nothing to eat and so flew off to more productive feeding grounds. The aimless tracks of a robin in the cold north may indicate the bird's dependence upon your generosity if he is to survive the winter.

Bird tracks at first look much alike, but with a little practice you can spot the all-important differences. The shape and size of the print, and the number of toes showing are characteristics which aid us in identifying bird tracks. Whether the tracks are in parallel pairs or staggered is also important.

Small birds hop as a rule; thus their footprints fall in parallel pairs. Larger birds actually walk, leaving prints in a staggered line. A few birds, such as the robin, divide

their locomotion almost evenly between hopping and walking.

The sparrow, a hopping bird, leaves paired prints. To identify these from the prints of other hopping birds, note that the side toes are commonly shorter than the middle ones. The size, too, is of some help, being about an inch long.

The toes of a crow are distinctive, the middle toe being definitely nearer to the inner than the outer toe. The crow's track is about three and one-half inches in overall length, with the hind toe print about one inch long. The prints may be paired or alternate, for the crow sometimes hops and sometimes walks. When walking, the toes usually drag.

The robin's toes commonly drag and the three front toes are evenly spaced. The prints may be either paired or alternate, but they are much smaller than those of a crow, being around two and a quarter inches in all. While a starling's tracks closely resemble those of a robin, they are about a quarter of an inch longer.

Science News Letter, January 9, 1954

MEDICINE**Chilling May Save Life of Newborn**

► NEWBORN BABIES threatened by death from suffocation because of a difficult birth may be saved by chilling them, Dr. James Miller and his wife, Dr. Faith Miller of Emory University, Ga., advised at the meeting of the American Association for the Advancement of Science in Boston.

They based this advice on their studies of the effects of deep chilling combined with unconsciousness in guinea pigs.

When chilled and made unconscious by a drug, the guinea pigs could stand twice the oxygen lack of control guinea pigs.

Since in most hospitals, the newborn baby is partially narcotized, or unconscious, from the pain-relieving drugs given the mother during childbirth, chilling will, the Miller doctors stated, "prove especially effective" in overcoming asphyxia of the newborn.

Science News Letter, January 9, 1954

ASTRONOMY**Suggest Spotting Matter In Intergalactic Space**

► DETECTION OF matter in the inconceivably vast spaces between the galaxies, the largest building blocks of the universe, by finding a calcium line in the light from galaxies, was suggested by Dr. A. E. Whitford of the University of Wisconsin to the American Astronomical Society meeting.

Thirty years ago, astronomers were divided as to whether or not there was any matter in the spaces between the stars of our own Milky Way galaxy. Since then, however, they have found plenty of evidence not only that such matter is present, but that it may be the source of material for the formation of stars themselves.

Now, astronomers are divided as to whether or not intergalactic space, extending for millions of light-years between neighboring galaxies, is or is not completely devoid of matter. Such matter, Dr. Whitford suggested, might be detected by a calcium line in the light from other galaxies. The calcium line would be caused by the absorption of light of certain wavelengths in the invisible ultraviolet by atoms of ionized calcium.

Just such absorption lines in the light from stars in our own Milky Way galaxy first led to the discovery that there was interstellar matter in space.

However, although thousands of special photographs of other galaxies have been made, chiefly with the 100-inch and 200-inch telescopes, no intergalactic calcium lines have yet been detected. This appears to indicate that any matter in the spaces between galaxies is extremely rarefied.

Another possible method of spotting intergalactic matter, Dr. Whitford suggested, is the radiation of radio energy by intergalactic hydrogen at wavelength 21 centimeters. This perhaps could be observed against the "hot" background of another galaxy, such as the Andromeda nebula, if there were a very rarefied gas in the intervening space.

Science News Letter, January 9, 1954

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• New Machines and Gadgets •

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SELF-LEVELING STEPLADDER has a special hinge-like device that adjusts the ladder to stand on uneven surfaces without twist, sway or walk, the maker reports.

Science News Letter, January 9, 1954

ELECTRIC FORK lift truck can be used in hazardous locations involving fire or explosion. Backed by an Underwriters' Laboratories seal of approval, the trucks are said to be safe in areas containing gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors and natural gas.

Science News Letter, January 9, 1954

SIGNAL LIGHT and ashtray combine into a small unit for restaurant tables to attract the attention of the waiter. When the customer wants something, he merely pushes a button on top of the device. A soft light that in effect says, "Hey, waiter!" winks on silently.

Science News Letter, January 9, 1954

COVERING MATERIAL for kitchen counters, showers and shelves can be cut with scissors or a sharp knife to the proper contours. It can be held in place with pressure-sensitive tape or recommended cements. The vinyl-plastic-surfaced mate-



rial, shown in the photograph, resists moisture, abrasion, soaps, oils and greases.

Science News Letter, January 9, 1954

FLY-TYING KIT enables the fisherman to whip up any of hundreds of hand-made lures. The kit contains colorful feathers,

quills, wool, fur, chenille, raffia, tinsel, floss, a hook vise, 24 fly-tying hooks, thread wax, tying threads, hook cement and instructions.

Science News Letter, January 9, 1954

CAMERA CASE has a built-in flashgun so that users of the 35mm Voigtländer camera no longer must carry flash equipment along in a separate bundle. One part of the case contains the flash reflector and another part contains a battery-condenser power supply. The manufacturer anticipates developing similar cases for other camera makes.

Science News Letter, January 9, 1954

AIR PUMP for home aquariums works on a thermal principle that involves no moving parts. It produces a stream of air and works silently and efficiently in tanks holding three to 30 gallons of water. When combined with special filtering equipment, the butyrate plastic device filters and aerates about 80 gallons in 24 hours. It works on ordinary house current.

Science News Letter, January 9, 1954

SHAMPOO DISPENSER is a palm-sized plastic device consisting of a chamber in which the shampoo solution is stored. Attached to the lower chamber is a set of tiny flexible plastic fingers. When squeezed, the dispenser squirts out a tiny stream of the shampoo and the finger-like probes work up a lather while massaging the scalp.

Science News Letter, January 9, 1954

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Do You Know?

Anthropoid apes are much stronger than men on a weight-for-weight basis.

A baby electric eel can give you a 120-volt shock.

Malaria now is no more of a military problem than smallpox or typhoid.

It would take up to 2,000 fireflies, flashing simultaneously, to produce the same room illumination as a single candle.

At the speed of sound, the leading edges of a low-flying airplane grow 95 degrees warmer than the surrounding air; at 10 times the speed of sound, they can reach an incandescent 9,000 degrees Fahrenheit.

Undesirable "dwarf" calves may be reduced on cattle ranches by a "profilometer," a device that detects a small bulge on the bull's head; the bulge seems to mean that the bull is likely to sire dwarf offspring.